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On a New Species of *Limnecodium* from Japan.

By

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With 3 Text-figures.

On September 22nd., this year (1921), some individuals of a small medusa were found swimming in an old well in the town Tsu, Province Ise (Central Japan). Superficially they presented such close resemblance to *Limnecodium kawaii* Oka from Yantsekiang, described in this journal some fourteen years ago, that we at first believed them to belong to that species. On closer examination, however, they proved to be new to science, differing markedly from the other species of the genus in the structure of the velar statocysts and the manner of arrangement of nematocysts on the tentacles, as well as in some less important characters. As the discovery seems to be of great interest both from biological and zoogeographical point of view, we give in the following a short account of our medusa which we propose to name

Limnecodium iseanum, n. sp.

Umbrella. The umbrella is dish-shaped, much broader than high, with thin walls. The velum is about one fourth as broad as the diameter. When fully expanded, the umbrella is perfectly flat or even slightly concave aborally, with the velum hanging vertically downward from the margin. Largest specimens measure about 18 mm. across.

Manubrium.—The manubrium forms a four-sided pillar, nearly as

1) Oka, A. Eine neue Süßwassermeduse aus China. Annot. Zool. Japon. Vol. VI, Part 3. 1907.

long as the radius of the umbrella, hanging down from the centre of the quadrangular stomach. The mouth-opening at the lower end of the manubrium is also quadrate, with the corners prolonged into crumpled lobes. As usual, the corners of the stomach as well as the oral lobes lie in the perradii.

Canal system.—There are four radial canals which have the appearance of thin transparent tubes running from the base of the stomach to the margin of the umbrella. The circular canal, into which the radial canals open, is rather voluminous and is plainly visible. The margin of the umbrella is made conspicuous by the presence of a narrow ribbon-like zone of high ectodermal cells bearing nematocysts. Its course is highly undulating, being bent upwards at the base of each tentacle in the form of an inverted V. Centripetal canals, ending blindly at some distance from the margin, such as are usually present in *Olindias*, *Gonionema*, etc. are entirely absent:

Gonads.—The gonads occur in the form of four flattened leaf-like bodies hanging freely down from the subumbrella, one below each radial canal, about half way from the margin. In all the specimens examined, the gonads appeared to be spermares.

Tentacles. The tentacles are placed very regularly in six cycles of 4, 4, 8, 16, 32, and 68 respectively, giving a total number of 128. Those of the first order, which are situated in the perradii, are nearly 20 mm. long when extended; those of the second order are only a little shorter. The tentacles of the third, fourth, and fifth orders have a length of 14 mm, 9 mm, and 4.5 mm respectively. As in the other species the tentacles leave the exumbrella at some distance from the margin, the amount of the distance decreasing with the order of the tentacles.

Statocysts.—The velar statocysts are placed one at the base of each tentacle, so that their number equals that of the latter. Contrary to the other species, in which each statocysts is produced into a long centrifugal canal, passing through the thickness of the velum and ending blindly near its margin, the statocysts of our new species are, without exception,

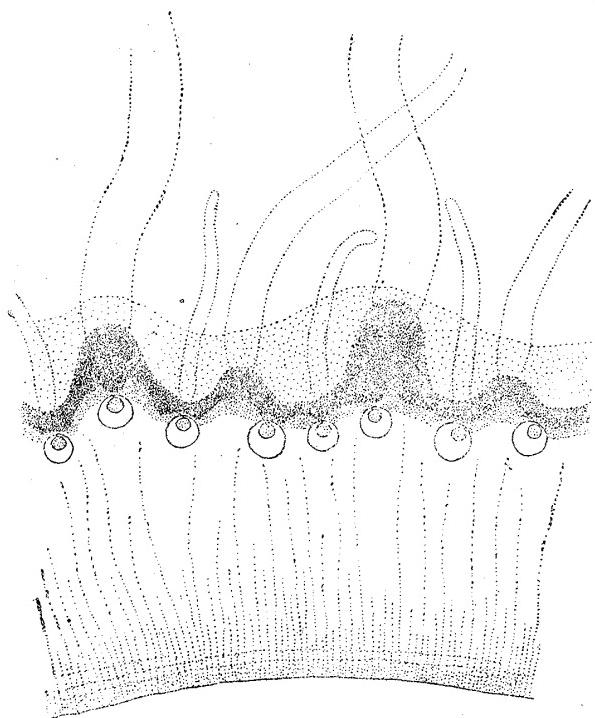


Fig. 1. *Limnocodium iseannum* n. sp.
Part of umbrella-margin with velum, showing
velar statocysts. $\times 30$.

nematocysts are, in *Limnocodium sowerbyi*, definitely arranged at the ends of little papillae. At first there are one or two nematocysts in each papilla, but later on the number increases to five or more. It is exactly so in *L. Kawaii* too. In *L. Iseannum*, on the contrary, there are no such papillae, and the nematocysts are either fairly uniformly distributed all over the surface or arranged in rings surrounding the tentacle. A glance at the accompanying figures, representing the tentacles of *L. Kawaii* and *L. Iseannum*, will suffice to show that there is a marked difference between the two medusae in this regard. The tentacles are hollow, but as the endodermal cells are large and vacuolated, it is impossible to recognize the axial cavity in surface view.

2) Browne, E. T. On the Freshwater Medusa Liberated by *Microhydra ryderi*, Potts, and a Comparison with *Limnocodium*. Quart. Journ. Micr. Sci. Vol. 50, Pt. 4, 1906.

regularly spherical and limited to the basal part of the velum. As the presence of such canals has been considered as the chief peculiarity of the genus, the discovery of a new form without them would of course necessitate a modification in the generic diagnosis.

Distribution of nematocysts.—Another peculiarity of the new species consists in the manner of arrangement of the nematocysts on the tentacles. As already pointed out by Browne (2), the nema-

During life our medusa presents the posture peculiar to the genus. The umbrella, when not contracted, is perfectly flat, and the velum hangs down almost vertically from the margin. The tentacles are all directed upwards, i. e. aborally, and the manubrium and the gonads project freely from the subumbrella. In this posture it looks not unlike a

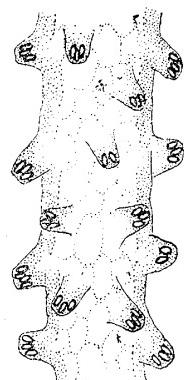


Fig. 2. *L. kawaii.*
Portion of a small tentacle. $\times 250$.

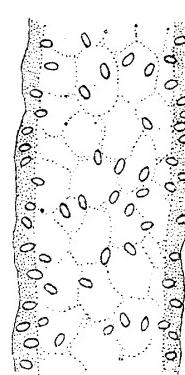


Fig. 3. *L. iseicum.*
Portion of a small tentacle. $\times 250$.

gigantic Campanularian medusa swimming with the umbrella turned wrong side out. Preserved in formalin, the umbrella invariably contracts to some extent and the animal assumes a form not differing in any way from an ordinary Hydromedusa.

Comparing the three species of *Limnecodium* now known to us, we find that they naturally form two groups, one consisting of *sowerbyi* and *kawaii*, and the other represented by *iseanum* alone. The first two agree tolerably well in most of the essential characters, the differences being confined to such points as the size of the umbrella, the number and relative sizes of the tentacles etc., while the latter is distinguished from them by very important characters affecting the original diagnosis of the genus. The most practical way of expressing the mutual relationship of these forms would be, I think, to regard the medusa from Yantsekiang as a variety of the type species and name it *Limnecodium sowerbyi* var. *kawaii*.

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The well in which the new species was discovered, is an ordinary artificial spring, such as are commonly found in any Japanese town. It is a cylindrical pit with a diameter of 0.7 meter; the surface of water is about 0.5 meter below the surface of the surrounding ground. It is uncovered, and the sun shines into it freely. The water is about 2.5 meters deep; the temperature of water was 22°-23° C in day-time. There are still some living medusae in the well, and it is highly probable that the hydroid generation is hidden somewhere at the bottom. How the germ found its way into the well remains to be explained.

Tokyo, Oct. 25th., 1921.
